Section 6
Framework for Addressing Needs of Small Systems

Small public water systems (less than 500 connections) in King County (County), which collectively serve two percent of the County population, face challenges that are in many ways different from those faced by the larger utilities discussed in the previous section. Unlike larger Group A systems, small systems more often struggle to deal with water quality concerns, and system capacity issues, including a lack of financial, technical, and administrative resources. This section presents a summary discussion of these issues faced by small systems, an estimate of the impact such issues may have upon the availability of small system water supplies, and a general strategy for addressing the needs of those small systems impacted by these problems.

The Washington State Department of Health (DOH) administers programs as a part of an existing regulatory framework in order to provide approaches to small system problems. Such activities include the coordinated water system planning process (as authorized by the Public Water Supply Coordination Act), issuance of Group A operating permits as indicators of system compliance and adequacy, and the current development of system capacity requirements under the Safe Drinking Water Act. The solution framework that is developed in this chapter is intended to relate the existing regulatory framework, and potentially other approaches, to the specific situations in King County. While many options are presented for alternate water supply provision, it is likely that in many cases, the preferred solution will be for small systems to make new arrangements to obtain water from larger utilities in the County.

6.1 Identification of Water Quality Issues that May Lead to Water Supply Shortfalls

One of the many challenges that public water systems face is maintaining adequate water quality in source waters as well as the final product distributed to consumers. For most large systems, this is addressed by system design, regular monitoring of regulated contaminants, and implementation of treatment and other corrective measures when problems arise. However, smaller systems are generally more easily compromised by water quality concerns, due to their lack of administrative and financial ability to handle problems when they occur. In such cases, some systems may be forced to abandon their sources and look elsewhere for new and additional water supplies. In this context, water quality concerns are relevant to the overall goal of potential shortfall identification in the Consolidated Report.

Water quality concerns are difficult to predict for many reasons. General geographical areas containing elevated concentrations of naturally occurring

contaminants, such as arsenic and radon, can be identified, but the actual impacts upon individual water systems is difficult to isolate, due to the heterogeneous nature of subsurface materials and chemical composition in both sediments and ground water. Furthermore, some water quality concerns become potential problems only when compounded by other conditions such as time of year and amount of consumption. It is assumed that there will occasionally be such events of degraded water quality, but the location and timing of these is somewhat unpredictable. Over time, systematic tracking of Department of Health (DOH) permit status, violations of regulatory requirements, and ability to meet timelines set for new regulatory initiatives may provide a tool for flagging systems with substantial needs.

Many types of water quality problems can be resolved through corrective actions involving treatment or operational procedures. However, the high costs associated with the implementation of some corrective actions, such as treating for low levels of manganese, can be financially burdensome to some systems. Therefore, the presence of a water quality problem does not necessarily indicate a water-supply shortfall, but may be an indicator of future financial and administrative challenges that may be difficult for a small system to overcome.

Considering these characteristics of water quality issues and their relevance to this report, a review of available water quality data and regulatory issues was performed. This review yielded a characterization of water quality concerns for public water systems within King County and a projection of the amount of water supply shortfall that may occur due to an estimated number of water systems being compromised by water quality issues.

6.1.1 Summary of DOH Water Quality Data

Certain water quality data for all active Group A and Group B public water systems within the State is stored in the Drinking Water Automated Information Network (DWAIN) database, which is maintained by DOH. The types of water quality information contained in the database include water system data received directly from public water systems via the Water Facilities Inventory (WFI), analytical results submitted by laboratories, and violation and enforcement data entered by DOH personnel. The accuracy of the database is limited by the presence of incomplete and incorrect data submitted on the WFI, data in DWAIN that has not been error-checked or updated, and errors that may occur as information is entered in the database.

Contact with DOH staff was made to identify additional sources of information besides that contained in DWAIN. Data regarding measured arsenic concentrations in water supplies and Surface Water Treatment Rule (SWTR) violations were obtained in this manner.

It should be noted that this water quality data review is based solely upon information reported to DOH, and data obtained by DOH studies. Many small systems do not report required information to DOH; therefore, this analysis is not a thorough review of the water quality issues faced by all water systems throughout the County. The results of this analysis should be considered as an indicator of the general magnitude of water quality issues facing King County public water systems. The level of effort to review all water quality data and to determine the number of systems not adequately reporting data to DOH is beyond the scope of the Consolidated Report.

Table 6-1 summarizes King County water quality data retrieved from DWAIN and DOH staff in July 2000. As is evident in Table 6-1, there are no significant water quality concerns facing public water systems in King County. In recent years, there have been very few Maximum Contaminant Level (MCL) violations. However, as discussed in the section following the table and later in Section 6.1.4, there are some emerging water quality issues that may impact small public water systems to a greater extent in the future.

Details regarding the specific parameters included in this review are provided below.

- Coliform Water Quality Violations – Public water systems are required to routinely monitor coliform bacteria levels. If, during this process, coliform or *E. Coli* presence is detected, a Non-Acute or Acute Coliform MCL violation may occur.

  A Non-Acute violation occurs when:
  Systems taking less than 40 routine samples per month have more than 1 sample with coliform presence; or
  Systems taking more than 40 routine samples per month have more than 5.0 percent with coliform presence.

  An Acute violation occurs when:
  Fecal coliform is detected in a repeat sample; or
  E. Coli is detected in a repeat sample; or
  Coliform is detected in any repeat samples collected as a follow-up to a sample with fecal coliform or *E. Coli* presence.

  Table 6-1 indicates that between 1998 and 2000, 29 systems in King County have had Non-Acute violations, while three systems have had Acute violations. Many public water systems will occasionally have such violations; however, this is no great cause for alarm. Typically, the situation can be corrected by adjustments in the water treatment process or cleaning of the distribution system.

Table 6-1
Summary of Department of Health Water Quality Data for King County [1]

	Number of Systems with Water Quality Violations or Exceedances, by Category [2]						
	Group A-Community						
	Large [4]						
	SPU Customers [5]	Non-SPU Customers	Small	Group A-NTNC	Group A-TNC	Group B [3]	All Categories
Total Number of Systems in King County with Water Quality Data Retained by DOH	**27**	**24**	**112**	**12**	**48**	**34**	**191**
Water Quality Parameter [6]							
Coliform Water Quality Violations							
Non-Acute Total Coliform MCL Violation [7]	0	1	20	2	6	0	29
Acute Total Coliform MCL Violation [8]	0	0	0	0	1	2	3
Coliform Monitoring Violations							
Major Monitoring Violation [9]	1	0	27	3	29	2	62
Major Repeat Monitoring Violation [10]	1	1	8	0	3	1	14
Nitrate [11]							
MCL Violation	0	0	0	0	0	2	2
Trigger Exceedance	0	0	0	0	0	13	13
Organic Contaminants [12]							
MCL Violation	0	0	0	0	0	0	0
Trigger Exceedance	3	5	2	0	1	1	12
Disinfection By-Products [13]							
MCL Violation	0	0	0	0	0	0	0
Lead/Copper							
90th Percentile of Samples Exceeds Action Level [14]	3	11	25	1	0	1	41
Arsenic							
MCL (existing) Violation [15]	0	0	0	0	0	3	3
Surface Water Treatment Violations							
Surface Water Treatment Rule Violation [16]	0	0	4	0	0	0	4

Notes associated with this table are on the following page.
TNC = Transient/Non-Community
NTNC = Non-Transient/Non-Community

Table 6-1 Notes:

(1) Source of data: DOH Drinking Water Automated Information Network (DWAIN) Database, except for Arsenic and Surface Water Treatment Violations data, which was obtained directly from DOH, Division of Drinking Water, staff. DWAIN data for coliform water quality and monitoring violations is for years 1998-2000. DWAIN data for other data is for years 1995-2000.

(2) Regulatory categories defined by DOH.

(3) Data are presented only for the 34 King County Group B systems that have 10-14 connections, since water quality regulatory enforcement for these systems is fully within the jurisdiction of DOH. Similar enforcement authority for Group B systems having less than 10 connections is held by the Seattle-King County Department of Public Health. Water quality data similar to that presented in this table was not available for these systems. In total, there are 1,648 Group B systems in King County.

(4) For the purposes of this report, "large" public water systems are considered to be those serving more than approximately 500 connections. See footnote 1 on page 1-2 for more explanation.

(5) Those public water systems receiving at least a portion of their water supply from Seattle Public Utilities.

(6) The following regulatory terms are used in evaluating some water quality parameters:
MCL = Maximum Contaminant Level. Values are listed in WAC 246-290-310. If measured values exceed an MCL, follow-up actions are required by Washington State Department of Health (DOH). Only parameters with primary MCLs were analyzed for this report, as they have greater potential impacts upon public health. There are other parameters (e.g., iron, manganese, color, and turbidity) for which secondary MCLs have been developed. These are not covered in this review.
Trigger = Trigger Level, as defined by the USEPA. The exceedance of a trigger level by a sample does NOT constitute a regulatory violation. If measured values exceed a trigger level, follow-up monitoring may be required by DOH. Specific definitions of trigger levels, and associated required follow-up actions, vary amongst water quality parameters.

(7) Non-Acute Total Coliform MCL Violations occur when:
Systems taking less than 40 routine samples per month have more than 1 sample with coliform presence; or
Systems taking 40 or more routine samples per month have more than 5.0 % with coliform presence.

(8) Acute Total Coliform MCL Violations occur when:
Fecal coliform is detected in a repeat sample; or
E. Coli is detected in a repeat sample; or
Coliform is detected in any repeat samples collected as a follow-up to a sample with fecal coliform or *E. Coli* presence.

(9) A Major Monitoring Violation results from no routine monitoring being performed.

(10) A Major Repeat Monitoring Violation results from no repeat samples being taken when required.

(11) MCL for Nitrate is 10.0 mg/L. Trigger Level for Nitrate is 5.0 mg/L.

(12) All organic contaminants with a primary MCL, except for disinfection by-products. MCLs are listed in WAC 246-290-310. Trigger Levels are generally equal to detection limits, as listed in WAC 246-290-310.

(13) Disinfection By-Products include all trihalomethanes (THMs) and haloacetic acids (HAAs). MCLs are listed in WAC 246-290-310.

(14) According to the federal Lead and Copper Rule (LCR), public water systems must conduct lead and copper monitoring at customer taps. Required actions of corrosion control treatment, source water treatment, lead service line replacement, and public education are necessary if the 90th percentile of home sample levels exceed the action levels. Action levels for lead and copper are 0.015 mg/L and 1.3 mg/L, respectively.

(15) The current arsenic MCL is 50 parts per billion (ppb). In addition to the three systems identified here, there are two King County Group B systems that have active sources with measured arsenic levels greater than 50 ppb. In October 2001 the USEPA announced a decision to lower the MCL to 10 ppb. Compliance with this revised MCL is required by 2006. A recent study of public water systems revealed that approximately 25 Group A Community water systems in King County have exceeded this standard at some point in the past five years . Therefore, such systems may be affected by the lowering of the MCL.

(16) Violations of the Surface Water Treatment Rule (SWTR) include:
Surface water systems with unfiltered supplies; and
Systems with treatment technique violations.

- Coliform Monitoring Violations – Each public water system is required to develop a coliform monitoring plan and analyze samples periodically. Failure to perform specific sampling tasks may result in a coliform monitoring violation. A *Major Monitoring Violation* results from no routine monitoring being performed. A *Major Repeat Monitoring Violation* results from no repeat samples being taken when required. In King County, 62 systems have had Major Monitoring Violations between 1998 and 2000, with 14 systems having had Major Repeat Monitoring Violations during that time period. These violations are remedied by implementation of proper monitoring and do not directly indicate threats to public health.

- Nitrate – DWAIN contains data relating to the monitoring of many inorganic chemicals. An example of such parameters is nitrate. According to the data obtained in July 2000, no Group A systems had MCL violations for nitrate between 1995 and 2000. However, 2 Group B systems had samples that violated the MCL, and 13 Group B systems had samples that exceeded trigger levels[1]. According to DOH staff, the water systems most likely to be impacted by nitrate in the future are very small systems located in rural portions of King County. As development encroaches upon land historically used for agricultural purposes (e.g., areas where fertilizers have been heavily used or where livestock was raised), new wells may experience elevated concentrations of nitrate. This may pose additional treatment or operational challenges to some small systems in rural King County.

- Organic Contaminants – As shown in Table 6-1, there have been no recent organic contaminant MCL violations in King County. Twelve systems have had samples that exceed trigger levels, which typically equal analytical detection limits for such constituents. Based upon these results, organic contamination does not pose a significant water quality threat to water systems in King County.

- Disinfection By-Products – As discussed in more detail in Section 6.1.4, the proposed Stage 2 of the Disinfectants/Disinfection By-Products (D/DBPs) Rule is expected to be adopted in 2001. While not lowering the MCLs for these contaminants, monitoring requirements will become more stringent and will impact a greater number of systems. As shown in Table 6-1, there have been no recent MCL violations for D/DBPs. Based upon these results, D/DBPs are not anticipated to be a significant water quality challenge in the future for King County public water systems.

[1] Trigger levels are concentrations defined by the U.S. Environmental Protection Agency. The exceedance of a trigger level by a sample does NOT constitute a regulatory violation. If measured values exceed a trigger level, follow-up monitoring may be required by DOH. Specific definitions of trigger levels, and associated required follow-up actions, vary amongst water quality parameters.

- Lead and Copper – The federal Lead and Copper Rule (LCR) addresses lead and copper levels in the source water or resulting from corrosion of distribution piping and household plumbing. The LCR requires that public water systems conduct lead and copper monitoring at customer taps to determine if the 90th percentile of homes tested exceed lead and copper action levels. As shown on Table 6-1, a total of 41 public water systems in King County had the 90th percentile of customer tap samples exceed action levels between 1995 and 2000. Solutions to elevated lead and copper levels include corrosion control treatment and lead service line replacement.

- Arsenic – Prior to 2001, the MCL for arsenic was 50 ppb. As discussed in detail in Section 6.1.4, a revised arsenic MCL of 10 ppb was announced in October 2001. A recent study of public water systems throughout Washington revealed that approximately 25 Group A Community water systems in King County have ground water supplies with arsenic concentrations between 10 and 50 ppb [2]. Therefore, such systems may be required to implement new treatment or operational changes, or find new sources, by 2006 in order to be in compliance with a new, lower MCL.

- Surface Water Treatment Violations – Surface water supplies are regulated by the U.S. Environmental Protection Agency's (EPA) Surface Water Treatment Rule (SWTR). Among other requirements, this rule stipulates that surface water supplies must be filtered. Furthermore, the treatment technologies used for filtration and chlorination must meet strict standards. DOH maintains an active list of public water systems that have received treatment violations. As shown in Table 6-1, there were four systems in King County in July 2000, that had such violations[3].

Although specific systems can be identified by these various data sources as having had a particular water quality concern at a certain time, it is difficult to determine if potential water supply shortfalls are likely to result from such concerns. In many cases, given sufficient financial and administrative resources, the problems can be addressed by enhanced treatment or operational changes. Therefore, this data provides a general sense of water quality issues encountered by King County water systems, but cannot be used to identify specific systems that may experience supply shortfalls in the future. Section 6.3 presents a methodology to estimate the potential for future water quality concerns to lead to water supply shortfalls.

[2] Source of data: "Public water systems (Group A & Group B) in King County that have exceeded the new/proposed Arsenic MCL (10 ppb), Working Draft". Prepared by DOH, Division of Drinking Water, Division Services Section; January 16, 2001.
[3] Source of data: Interview with DOH, Division of Drinking Water staff member; March 7, 2001.

6.1.2 Summary of DOH Operating Permit Status

All Group A water systems are required to obtain an operating permit from DOH in accordance with Washington Administrative Code (WAC) 246-294. DOH associates each operating permit with a color category as an indicator of system compliance and adequacy. Operating permits are assigned a color of green, yellow, red, or blue. In general, a green operating permit indicates substantial compliance with DOH regulations. Yellow and red operating permits indicate conditional compliance and substantial noncompliance, respectively. A blue operating permit is given to systems that have not been evaluated by DOH.

Red operating permits may be issued when systems fail to satisfy criteria in WAC 246-294-040(2) (a) - (d). Criteria used to issue a red operating permit include being issued a State Health Order, confirmation as an unresolved significant noncomplier, and exceeding the number of DOH approved connections. Yellow operating permits may be issued when systems fail to satisfy criteria in WAC 246-294-040(2) (e) – (i). Criteria used to issue yellow operating permits include noncompliance with water system plan requirements, certified water works operator requirements, and water quality monitoring requirements.

Data about operating permits was obtained from DWAIN. Of the 223 Group A water systems included in the DWAIN database, approximately 50 percent have a green operating permit. Approximately 13 percent and 14 percent of Group A systems were listed as having yellow and red operating permits, respectively. A considerable number of transient/noncommunity and nontransient/noncommunity water systems have blue operating permits. There exist a few systems for which no permit colors have been assigned.

Although approximately 27 percent of the Group A systems evaluated currently have yellow or red operating permits, this does not necessarily mean that they will be required to abandon their sources and look elsewhere for new water supplies. It may be an indicator, however, of management difficulties. In conjunction with other factors, this may lead small systems to request new management by a nearby utility or a satellite system management agency, and in limited cases, may also result in the abandonment of existing sources of supply.

6.1.3 Summary of King County Water Quality Data

Seattle-King County Health has water quality information concerning Group B systems with less than ten connections. This information is contained within a tabular database, was more limited and has less information than that in the DWAIN database. For those reasons, and due to the small size of

most systems monitored, an analysis of this database was not performed for the Consolidated Report.

Seattle-King County Health has also identified issues such as low flow wells, saltwater intrusion, and elevated iron, manganese, and arsenic concentrations within the County. Information provided did not appear fully documented, and therefore, is not reproduced in this report. However, this information is indicative that these types of problems are present and could impact water supply.

6.1.4 New or Pending Regulatory Issues Concerning Water Quality

The following is a list of water quality related regulatory issues which public water systems in King County are currently facing or are anticipated to be required to address in the near future due to pending regulatory changes. As stated before, these issues generally can be remedied with sound administrative and financial management and implementation of necessary measures. Larger systems (primarily larger Group A community systems) are most able to effectively deal with situations as they arise and avoid any water supply shortfall as a result of water quality-based problems. It is the smaller Group A systems and Group B systems that are much more susceptible to these issues. Tracking of compliance with upcoming deadlines for addressing these issues may provide one tool for identifying systems that have inadequate capacity for managing these new requirements.

EPA undertakes a Regulatory Impact Assessment (RIA) at the national scale, as part of the rule-making process. One component of the RIA is an analysis of the costs of the proposed rule, including the range of impacts on water systems of varying sizes. Selected RIAs were reviewed in the course of preparing this Consolidated Report, as noted in the discussion of individual rules, below. In general, RIAs document that smaller systems (e.g. those with fewer than 500 customers) face much higher costs per household than larger systems. RIAs generally do not explore the overlapping impacts of multiple new regulations. In the context of the Consolidated Report, it is worth noting that multiple new regulations could combine to produce significant financial obligations for many small systems. In some cases, these financial obligations may lead small systems to re-evaluate their options in terms of continuing to provide independent water service to their customers (see Section 6.4).

- New Ground Water Rule

  This proposed federal regulation is anticipated to be finalized by spring of 2002, and would affect all public water systems with greater than 15 connections. The overall goal of this regulation is to encourage more intense monitoring and correction of water quality concerns for ground

water systems. Basic components of the rule include responses to sanitary surveys, hydrogeologic sensitivity assessments, source water microbial monitoring (primarily for systems not using disinfection), implementation of corrective actions to address identified problems, and compliance monitoring. Systems would be required to have 4-log bacterial inactivation (i.e., 99.99 percent). Additional treatment beyond a system's current facilities would be necessary only if monitoring reveals that the inactivation goal is not being met.

Most of the water systems in King County that do not purchase water from the Seattle regional system rely primarily on ground water supplies. The Ground Water Rule would, therefore apply, if approved in its current form, to many systems in the County. In general, it is anticipated that water systems using ground water would be able to meet the new Rule's requirements through monitoring and (where necessary) corrective actions. Costs of achieving these requirements will vary. EPA's nation-wide RIA estimated that, on average, water systems will face annual costs ranging from $46 per household for systems with fewer than 100 customers, to $2.27 per household for systems with 1,001 to 3,300 customers; to $0.46 per household for systems with 10,001 to 50,000 customers. Some systems may face much higher costs, particularly those systems that are required to take corrective actions, such as installation of disinfection facilities.

- Ground Water Under the Influence of Surface Water (GWI)

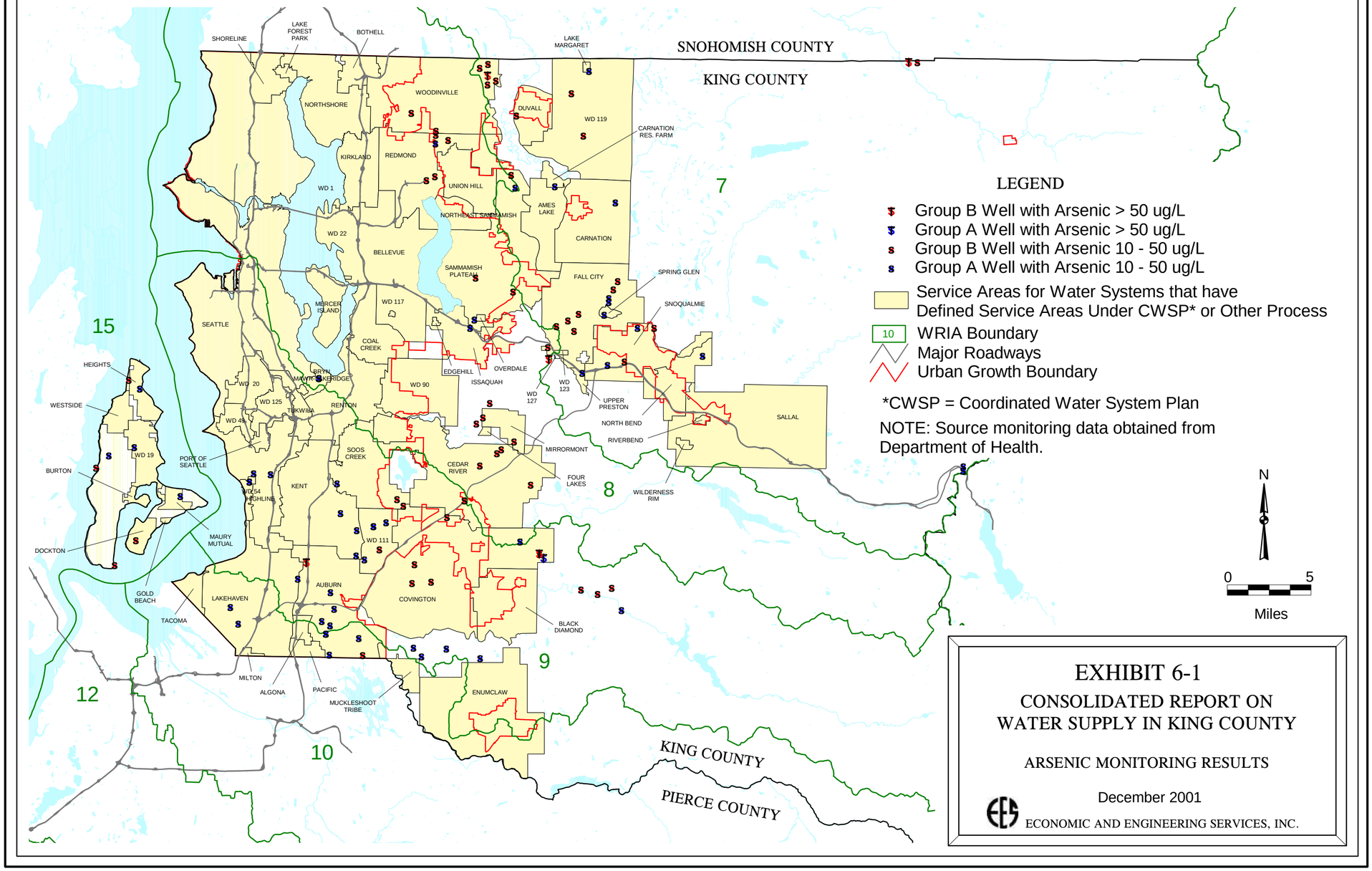
  An issue that is closely related to the proposed Ground Water Rule is that of ground water under the influence of surface water (GWI). One of the causes of deteriorated water quality in drinking water wells is intrusion of surface water into the ground water supply. Such mixing of water sources brings about the potential for surface water-borne contamination to reach ground water, requiring greater attention to a wider variety of water quality concerns than is typical for ground water systems. In order to address this issue, DOH has instituted a GWI program, by which public water systems having the potential for GWI are required to undergo a variety of tests and assessments in order to determine if their sources are in fact affected by GWI. This initial determination of the potential for GWI is based on evaluation of hydrogeologic characteristics of the area surrounding a water system's source(s) and depths of wells. As of January 2001, approximately 30 systems throughout the State have been identified by DOH as having GWI potential, with only one system being definitively evaluated as having a GWI source. This program is fairly new; therefore, the potential exists for many more systems to be identified as having GWI sources. This is especially true for small systems for which there is little data available to make preliminary determinations.

- New Arsenic Rule

  Arsenic is a naturally occurring element commonly found in ground water in western Washington Prior to 2001, the arsenic MCL was is 50 parts per billion (ppb). The EPA announced on October 31, 2001, the establishment of a new arsenic MCL of 10 ppb. Community and non-transient, non-community type water systems will be expected to comply with the revised drinking water standard by January 23, 2006. This will force many systems to enhance their treatment processes. Well monitoring data obtained from DOH reveals that both Group A and B systems could be affected by the new MCL (see Exhibit 6-1). Large, primarily surface water-based systems could address the lowered MCL by adjusting their coagulation and filtration processes. Smaller, ground water-based systems may be faced with potentially very expensive treatment upgrades, such as implementation of ion exchange, membrane filtration, and reverse osmosis technologies.

- Cost estimates for achieving these requirements vary greatly. EPA's nation-wide RIA estimated that, on average, water systems will face annual costs ranging from $357 per household for systems with fewer than 100 customers, to $57 per household for systems with 1,001 to 3,300 customers; to $29 for systems with 10,001 to 50,000 customers. In total, EPA estimated a national annual cost of $181 million. By comparison, the American Water Works Association Research Foundation estimated that the total cost of compliance with the new standard would be approximately $590 million annually. Such differences are attributed to different assumptions regarding choice of treatment technology, cost of waste disposal, and additional land purchases. Proposed Radon Rule

  Radon is a naturally occurring radioactive contaminant linked with lung cancer. It is viewed as a concern when present in high concentrations in indoor air. As part of an effort to lower airborne radon levels, the concentration of the element in drinking water is now under regulatory scrutiny. A proposed rule is anticipated to be finalized in 2002. At this time the status of this rule is in flux at EPA. However, this rule will potentially involve an increase in costs at the local level.


SNOHOMISH COUNTY
KING COUNTY
SHORELINE
LAKE FOREST PARK
BOTHELL
LAKE MARGARET
NORTHSHORE
WOODINVILLE
DUVALL
WD 119
CARNATION RES. FARM
KIRKLAND
REDMOND
WD 1
UNION HILL
NORTHEAST SAMMAMISH
AMES LAKE
CARNATION
WD 22
BELLEVUE
SAMMAMISH PLATEAU
FALL CITY
SPRING GLEN
SNOQUALMIE
WD 117
MERCER ISLAND
SEATTLE
COAL CREEK
EDGEHILL
OVERDALE
ISSAQUAH
WD 90
WD 123
WD 127
UPPER PRESTON
NORTH BEND
SALLAL
RIVERBEND
MIRRORMONT
FOUR LAKES
WILDERNESS RIM
HEIGHTS
BRYN MAWR-SKYWAY
WD 20
WD 125
TUKWILA
RENTON
WD 49
WESTSIDE
SOOS CREEK
CEDAR RIVER
WD 19
PORT OF SEATTLE
BURTON
KENT
WD 54 HIGHLINE
MAURY MUTUAL
DOCKTON
WD 111
AUBURN
COVINGTON
GOLD BEACH
LAKEHAVEN
TACOMA
BLACK DIAMOND
MILTON
ALGONA
PACIFIC
MUCKLESHOOT TRIBE
ENUMCLAW
KING COUNTY
PIERCE COUNTY
7
8
9
10
12
15
LEGEND
Group B Well with Arsenic > 50 ug/L
Group A Well with Arsenic > 50 ug/L
Group B Well with Arsenic 10 - 50 ug/L
Group A Well with Arsenic 10 - 50 ug/L
Service Areas for Water Systems that have Defined Service Areas Under CWSP* or Other Process
10
WRIA Boundary
Major Roadways
Urban Growth Boundary
*CWSP = Coordinated Water System Plan
NOTE: Source monitoring data obtained from Department of Health.
N
0
5
Miles
EXHIBIT 6-1
CONSOLIDATED REPORT ON WATER SUPPLY IN KING COUNTY
ARSENIC MONITORING RESULTS
December 2001
ECONOMIC AND ENGINEERING SERVICES, INC.

A review of Washington State public water systems reveals that approximately 60 percent of community systems have radon concentrations in their distributed water exceeding 300 pCi/L, but falling well below 4,000 pCi/L. The overall finding in this analysis is that most systems within King County would be able to address the requirements associated with the alternate MCL and avoid losses in sources of supply. If the State does not immediately allow the alternate MCL option, radon could become a much larger issue, potentially driving some water suppliers to search for new alternate supplies.

- Disinfectants/Disinfection By-products

  Disinfection by-products (DBPs) are carcinogenic compounds that result from chemical reactions between naturally occurring organic matter (high concentrations of which can be found in surface water) and chlorine added as a disinfectant to drinking water. Stage 1 of the federal Disinfectant/Disinfection By-products (D/DBP) Rule is currently in effect and applies to large surface water systems. This rule determines the MCLs for DBPs present in distribution systems. Proposed Stage 2 of the Rule is anticipated to be finalized in 2002; and, while not lowering the MCLs for the contaminants, it will apply to smaller systems and will significantly affect the monitoring requirements. Under Stage 1, an overall average of DBP concentrations throughout the distribution system is used to determine a system's compliance. As part of Stage 2, a "local running average" will be implemented, which requires that a system meet the MCLs at each individual site tested. For some large utilities, this will involve upgrades to treatment processes to lower DBP concentrations in all areas of their distribution systems. For many smaller utilities that will need to begin disinfecting under the Ground Water Rule, the potential for D/DBP problems will be a new issue never before dealt with. Though not necessarily compromising sources, costs of treatment and monitoring could be much greater than what they are now for affected smaller systems.

- Operator Requirement

  The Final Operator Certification Rule was adopted by DOH on January 29, 2001. As adopted, the new rule requires all community and non-transient non-community public water systems to have a certified operator. According to DOH, approximately 1,900 water systems will fall under this new requirement. The rule allows "grandparenting" of current operators for small systems; however, this option only lasts for three years, after which time, all operators must be appropriately certified. While not being a direct cause for source abandonment, this rule may be a

driver in consolidation of small systems and more extensive use of the State's Satellite System Management program.

- Capacity Development

  The 1996 Safe Drinking Water Act (SDWA) required states to address system "capacity," including technical, managerial, and financial capabilities. DOH is undertaking a program to improve capacity of existing small systems, and ensure capacity of newly-created systems. This will require a long-term effort to provide technical assistance, education, outreach, and regulatory actions. This may provide an avenue of assistance and guidance to which small systems may refer when facing obstacles related to new water quality requirements. However, many systems may continue to have limited capacity to deal with complex requirements and system upgrades.

6.2 Identification of Administrative and Financial Issues Related to Source Viability

Small water systems generally have limited administrative, technical, and financial resources (i.e., "capacity") for managing the increasingly complex challenges associated with water supply. At the national level, EPA has estimated that water systems serving 3,300 or fewer people face infrastructure needs amounting to $3,000 per household annually[(4)]. Those needs represent investments required solely to protect public health, and do not include costs associated with growth. As substantial investments or more complex operational approaches are required over time, some smaller systems may be unable to meet state and federal requirements. For this reason, some smaller systems may find it advantageous to abandon their existing sources and merge into larger water systems. This generalization applies to systems not only within King County, but nation-wide.

The water quality issues discussed previously may cause some smaller systems to cross the threshold from viability to non-viability. For example, where new regulatory requirements affecting small ground water systems require capital investments, small systems may be unable to finance the required improvements. A similar situation may occur with aging wells or distribution infrastructure. This may drive the system towards merger with a larger system with a different source of supply (or purchase of water obtained from that source). Under varying circumstances, other small systems may face similar situations but have the resources to finance improvements. Therefore, a system's financial and administrative capacity can be a key variable in determining the viability of its source of supply.

[(4)] USEPA 1999 Drinking Water Infrastructure Needs Survey (Fact Sheet).

There is no reliable indicator of administrative and financial difficulties that can serve to predict specific systems that would need to abandon their sources of supply. The operating permit status (see Section 6.1.2) offers an indicator that can indirectly suggest which systems are currently having difficulties, but does not provide a sound basis for determining which systems will face this type of problem over time.

6.3 Estimate of Water Quality, Administrative, and Financial Impacts on Potential Water Supply Shortfalls

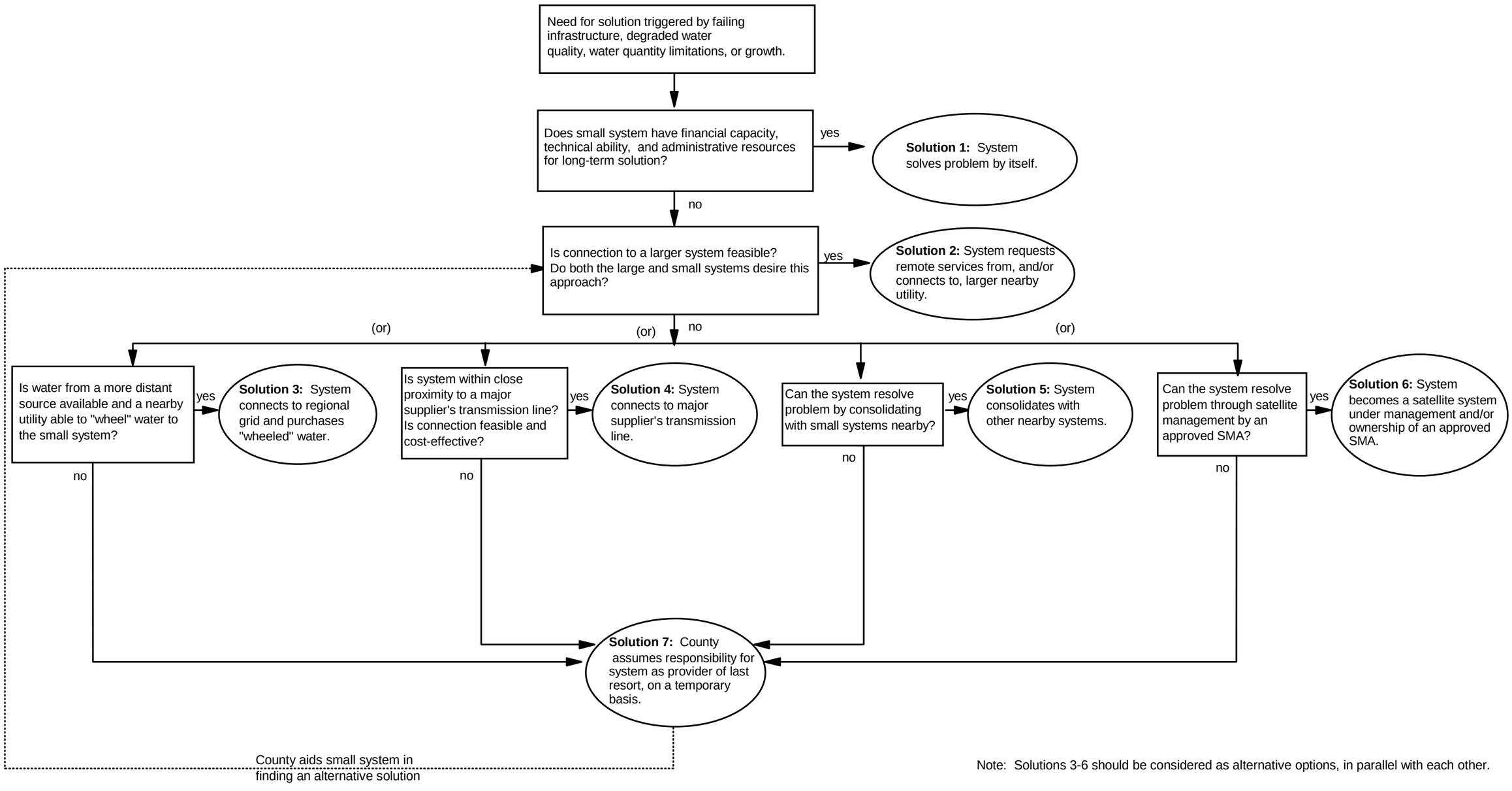
As stated throughout this report, water quality, administrative, and financial issues are not expected to be a cause of water supply shortfalls for large water systems within King County. With strong administrative and financial bases, these utilities can generally find ways to address problems and maintain their sources of supply. For smaller systems within the County (Small Group A systems and Group B systems which have less than 500 connections and collectively serve 2% of the County's population), water quality, administrative, and financial issues can have a much larger impact upon system viability. As mentioned previously, it is extremely difficult to identify which systems will have problems that will require them to abandon their source of supply and it is even more problematic to estimate the timing of such events. As an example, even if 25% of these small systems were to need to be supplied by other sources, the total amount of water would be less than on half of one percent of the water used in the County on a daily basis.

In addition to the public water systems discussed above, some individual household wells may be affected by water quality problems. These problems may go undetected, in the absence of a systematic monitoring program for household wells.

6.4 Small Systems Solution Strategy

Due to the large number of small systems in the County and the variety of issues that can affect their viability, a strategy for resolving shortfalls must contain many options and offer flexibility. This solution strategy emphasizes a general preference for larger utilities to assist failing small systems within their defined service areas, as long as this is desired by both parties. This solution is emphasized because it is most consistent with the Public Water System Coordination Act and the Growth Management Act (GMA). However, it should be noted that in many cases, other options are preferable to small systems, based on financial or administrative considerations. The solutions discussed below are summarized in Exhibit 6-2.

Exhibit 6-2
General Approach for Small Systems that may Need Alternative Sources of Supply Prior to 2020



Note: Solutions 3-6 should be considered as alternative options, in parallel with each other.

6.4.1 Solution 1: System Solves Problem Itself

To maintain autonomy, many small systems would prefer to solve any potential problems by themselves. For example, in the event of degraded water quality, a system may not have to abandon its source; rather, the treatment facilities may need to be enhanced or the system's operation may require modification. Given adequate financial and administrative means, this may be a feasible solution for some small systems in such situations. This option is also preferable in that it may result in a timely return to safe and reliable water for the system's customers. Some of the other options listed below require more time for implementation (the bulk of which is related to construction and overcoming physical constraints), and may cause a greater inconvenience to the public.

One limitation of this option is that many small systems lack the financial resources or technical capacity to implement solutions on their own. Grant funding or low-interest loans should be considered, but may not be available. Therefore, these systems may turn to one of the other options in the solution strategy.

A second drawback to this option is that although the solution may be feasible and fairly easy to implement, it may only be a temporary solution. For a system considering implementing its own solution, it is important to consider the longevity of the solution. Small "band aid" type solutions may be inadequate to protect public health over the long-term.

6.4.2 Solution 2: System Requests Remote Services from, and/or Connects to, Larger Nearby Utility

If implementation of its own solution is not feasible, the next option for a failing small system may involve the request of services from and/or connection to a larger nearby utility. Table 2-1 shows that 65 percent of Group A and 76 percent of Group B systems are located within larger utility service area boundaries. Not included in these percentages are additional systems located outside but very near the boundaries of a larger utility's service area. Therefore, this solution could potentially apply to many small systems.

In order to fully develop this option, it is necessary to understand the concept of defined service areas. The basis for defining service area boundaries is found in the Public Water System Coordination Act of 1977. As a requirement of this law, counties are to work in coordination with DOH, local planning agencies, and water purveyors to designate Critical Water Supply Service Areas (CWSSAs)[5]. The area within a CWSSA is then divided

[5] As defined in RCW 70.116.030, a CWSSA is a "geographical area characterized by a proliferation of small, inadequate water systems, or by water supply problems which threaten the present or future water quality or reliability of service in such a manner that efficient and orderly development may best be achieved through coordinated planning by the water utilities in the area."

amongst the water purveyors who provide service therein by establishment of service area boundaries. For larger purveyors, a service area is defined as a "specific geographical area serviced or for which service is planned by a purveyor." For smaller systems, service areas are defined only as areas currently served at the time of service area delineation. In addition to the development of service area boundaries within CWSSAs, DOH requires any water system developing Water System Plans (WSPs) to include a service area delineation as an element of their WSP, regardless of location within a CWSSA. If a water system has also discussed in its approved WSP how it would provide remote services to potential customers within its service area, that system is granted the authority and responsibility by DOH to provide such services, but only within its defined service area boundary. Therefore, a failing small system located within the service area of a larger utility that is involved in the processes outlined in the Coordination Act may request either remote services from, or connection to, the larger system. The larger utility is obligated to provide such services, if it can be done in a timely and reasonable manner. If in a particular situation, timely and reasonable service cannot be provided by the larger utility, the utility's service area will be adjusted to exclude that area. Such adjustments are made in the utility's water system plan update, as well as the updates to any adjacent utilities, and are then communicated to King County.

In order to facilitate coordinated water system planning within a CWSSA, a Coordinated Water System Plan (CWSP) may be developed by water purveyors and local planning agencies. A CWSP contains water system planning data from all water systems within a CWSSA and outlines roles and responsibilities of various entities involved in water resources and growth management. By State law, CWSPs are to be reviewed and amended every five years in order to meet changing needs.

CWSPs were initially developed for four areas in King County. The CWSPs for the areas of East King County, South King County, and Vashon Island were created to encourage a coordinated, regional approach to water supply planning. The primary purpose of the fourth King County CWSP (referred to as the Skyway CWSP) was to resolve specific service area disagreements between multiple utilities serving an area north of Renton. Of the four King County CWSPs, the East and South King County CWSPs encompass the largest land areas and include the service areas of many large water systems within the County. These plans were originally developed in 1989. The East King County CWSP was updated in 1998. No revisions have been made to the other three CWSPs.

One of the requirements of CWSPs is that they contain policies and procedures to account for failing systems. The primary way in which the East and South King County CWSPs address this is by recommending the development of a Satellite System Management Program (SSMP). The

principle behind this is that the County designates certain private or public entities as Satellite System Management Agencies (SSMAs) that are qualified to aid failing small systems through contractual services or transfer of ownership. Such programs are discussed in more detail in Section 6.4.6.

The East and South King County CWSPs also discuss provision of water to serve newly developed lands. As part of this discussion, responsibilities of existing utilities with service area boundaries are defined. By developing a designated service area, a water utility is claiming responsibility to ultimately provide service to all future growth within that area. Therefore, the first water service option for new development within a service area boundary is to receive service from that utility. However, it is acknowledged that a utility may not be able to provide timely and reasonable service to a new development. In this case, interim service agreements are allowed, with the provision that ultimate responsibility remains with the utility.

Given this understanding of utility service areas and their basis in law, it is reasonable that a failing small system located within the boundaries of another purveyor's service area should explore the option of requesting remote services from, or connection to, the larger system.

However, for this option to be feasible, certain conditions must exist, as listed below:

- *Adequate Supply.* The larger utility must have enough available supply to serve the additional customers it would gain from such a connection. If the smaller system is located within the utility's service area boundaries, it is assumed that the utility plans on ultimately serving those customers; however, the small system's failure may occur prior to the time when the utility plans to have capacity to assume the additional demand.
- *Proximity to Infrastructure.* For many utilities with defined service areas, existing water mains do not extend fully throughout their service area. This implies that water mains are planned for the future to cover the entire service area. In such a case, extending service to a small system at the time a problem occurs may be infeasible due to the high construction costs involved. To address this limitation, capital improvement plans may be accelerated in order to extend services sooner than originally anticipated; however, such plan revisions must be consistent with the larger utility's WSP.
- *Financial Considerations.* Financing the connection to the larger system may be an obstacle, especially if the small system customers are required to provide the funds. In some cases, there may be an incentive for the larger system to assume the cost of connection in order to gain additional customers.

In the long run, Solution 2 may have advantages over most other solutions. As larger water systems with defined service areas gradually serve more of the customers within their service areas, the overall strength of water supply in the County will improve, due to a combination of improved financial resources, technical and administrative capabilities, and regulatory oversight. Therefore, Exhibit 6-2 depicts Solution 2 as the next logical alternative after Solution 1.

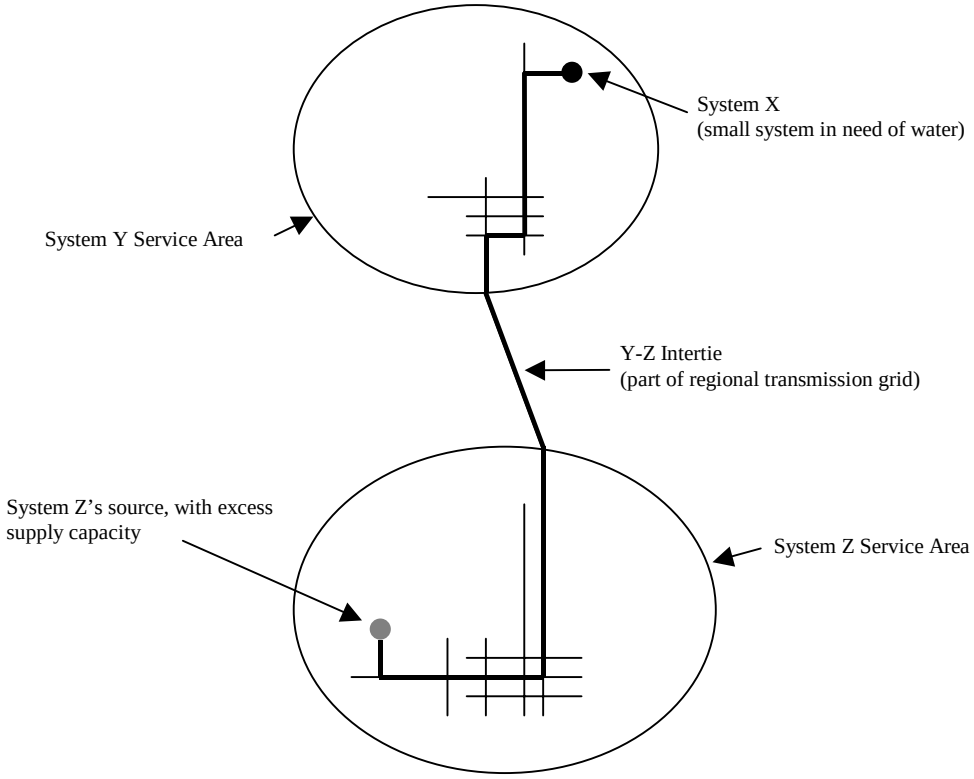
6.4.3 Solution 3: System Connects to Regional Transmission System and Purchases Wheeled Water

Another potential scenario involves a failing small system being located within an existing service area boundary and in close proximity to utility infrastructure; however, the larger utility does not have adequate water supply to accommodate additional customers at that time. As stated before, it is understood that utilities plan to ultimately serve their entire designated service area, but not all utilities may be able to serve a large amount of new customers all at once.

In this situation, a potential solution for the small system is to connect to the nearby available infrastructure and purchase water from a different utility wheeled through the regional transmission grid. The concept of the regional transmission grid is one that allows for transfer of water from one utility to another by means of multiple interties. In other words, system X may connect to the infrastructure of system Y in order to receive water that originated from system Z, as depicted in Exhibit 6-3. A slight permutation of this arrangement would be system X connecting to and purchasing water from system Y, with Y in turn purchasing water from system Z, in order to make up for any deficiencies in supply due to sales to X.

There are many situations where such solutions may eventually be feasible. For example, many utilities in East and South King County currently purchase water from Seattle Public Utilities (SPU) while also utilizing their own water sources. In these cases, infrastructure already exists to deliver water from SPU to the utility; therefore, a small system within the utility's service area could theoretically purchase water from SPU and obtain it via the utility's distribution system. Large intertie projects currently in design, such as the Tacoma Second Supply Project (TSSP) (which includes the SPU/Tacoma Water Intertie), will further aid in the implementation of the regional grid, by constructing pipes which will serve as the physical means by which water can be transferred.

Exhibit 6-3
Wheeling of Water Involving Multiple Water Systems



NOTE: Bolded line represents the route of wheeled water from System Z's source to System X (in need of additional supply), via the Y-Z intertie and System Y's infrastructure.

An added benefit of some arrangements of this type is the potential for conjunctive use of two or more water supplies. As discussed in relation to the TSSP in Section 4.4.2, a connection between a system relying on surface water and a system relying on ground water can help to optimize the use of water to meet multiple needs (i.e., meeting instream flow needs and municipal demand).

There are limitations that may exist associated with this solution option, many of which are similar to those listed for Solution 2:

- *Adequate Supply for Long-term*. The utility providing the wheeled water in such an arrangement as discussed above may have enough supply to solve the smaller systems problems at first, but future growth associated with the utility may reduce the amount of supply it can wheel in the future making this option an interim solution.

- *Adequate Water Rights.* In some cases, water rights may limit the ability of a larger utility to provide water to a smaller system. One way in which this may happen is in the form of a limited area being designated as the "place of use" for the water right. Often, a utility's water right is designated for use within city limits and cannot be legally used outside of that boundary. The water right may, or may not, coincide with a utility's designated service area. So, even within a service area this could potentially be a problem. To solve this dilemma, an application for change may be filed with Ecology in order to expand the "place of use;" however, this may require a lengthy process. Some utility organizations are currently working to reduce the limitations related to "place of use" to be able to more efficiently supply the needs within the region.
- *Infrastructure Capacity.* The infrastructure capacity of the seller, purchaser, and any intermediary to the wheeling process must be able to accommodate the flows. Appropriate analysis and accelerated capital improvements can address this limitation.
- *Legal, Technical, and Other Issues Concerning Intermediaries.* Unforeseen limitations may exist with the intermediaries, or those through whose systems the wheeled water will be conveyed.
- *Appropriate Compensation.* Agreement is necessary between all parties involved as to the correct compensation for the wheeled water, use of infrastructure, etc. This may require review and approval by multiple local and state agencies.
- *Water Characteristics.* Use of the regional transmission grid may result in blending of water from various sources, which can lead to adverse effects upon water characteristics, such as pH, hardness, etc. Appropriate studies will be needed to ensure resolution of issues related to water characteristics.

In some cases, Solution 3 could be used as a temporary measure until another solution can be implemented.

6.4.4 Solution 4: System Connects to Major Supplier's Transmission Line

Similar in many respects to Solution 3, there is another option available to a limited number of small systems in the County. If in close proximity to one of the major transmission lines in the County, a failing small system may be able to connect directly to the line in order to receive water from a regional supplier such as SPU or Tacoma Water. For the purpose of this discussion, it is assumed that a small system must be within approximately one mile of the transmission line in order for this option to be considered feasible. Even at this distance, costs would be substantial, relative to the number of customers served by small systems.

Exhibit 6-4 shows small system wells located within one mile of the major transmission lines in the County. Based on analysis of this data, approximately 239 small systems are located within one mile of a transmission line, as summarized below in Table 6-2. It should be noted that many of the systems included in this analysis are also located within larger utility service area boundaries and are likely close to existing utility infrastructure, which may make Solution 2 or 3 preferable over this option.

Table 6-2
Small Systems in Close Proximity to a Major Supplier's Transmission Line[1]

Transmission Line	Small Group A Systems within 1 Mile of Line	Group B Systems within 1 Mile of Line
Tolt River Pipeline	0	44
Cedar River Pipeline	9	77
Green River Pipeline (Tacoma)	0	27
Tacoma Pipeline 5 (Proposed)	5	51
Seattle-Tacoma Intertie (Proposed)[2]	0	26
Total	**14**	**225**

(1) This analysis is based upon GIS mapping data available from DOH.
(2) Many small systems close to the Seattle-Tacoma Intertie are also close either to the Cedar River Transmission Main or Tacoma Pipeline 5 and have, therefore, been excluded from this count to avoid double-counting.

As mentioned above, there are considerable limitations to this solution. The technical considerations alone could make this option infeasible in many cases. A brief list of the limitations follows.

- *Technical.* Those systems that will likely consider this option are typically in rural areas far from other infrastructure. Often, the topography in these areas is characterized by steep slopes, sometimes making the pumping and conveyance of water over long distances difficult. Other technical considerations include disinfection chemical contact times and storage requirements. The benefit of serving in this manner, what may only be a small cluster of homes, must be weighed against the costs of engineering the needed infrastructure.
- *Financial.* Related to the potential technical difficulties, the cost of implementing this solution may be great, precluding a small system with limited financial resources from pursuing the solution. However, there may be situations where multiple small systems in the same area could work together to finance this type of solution to the benefit of all systems.

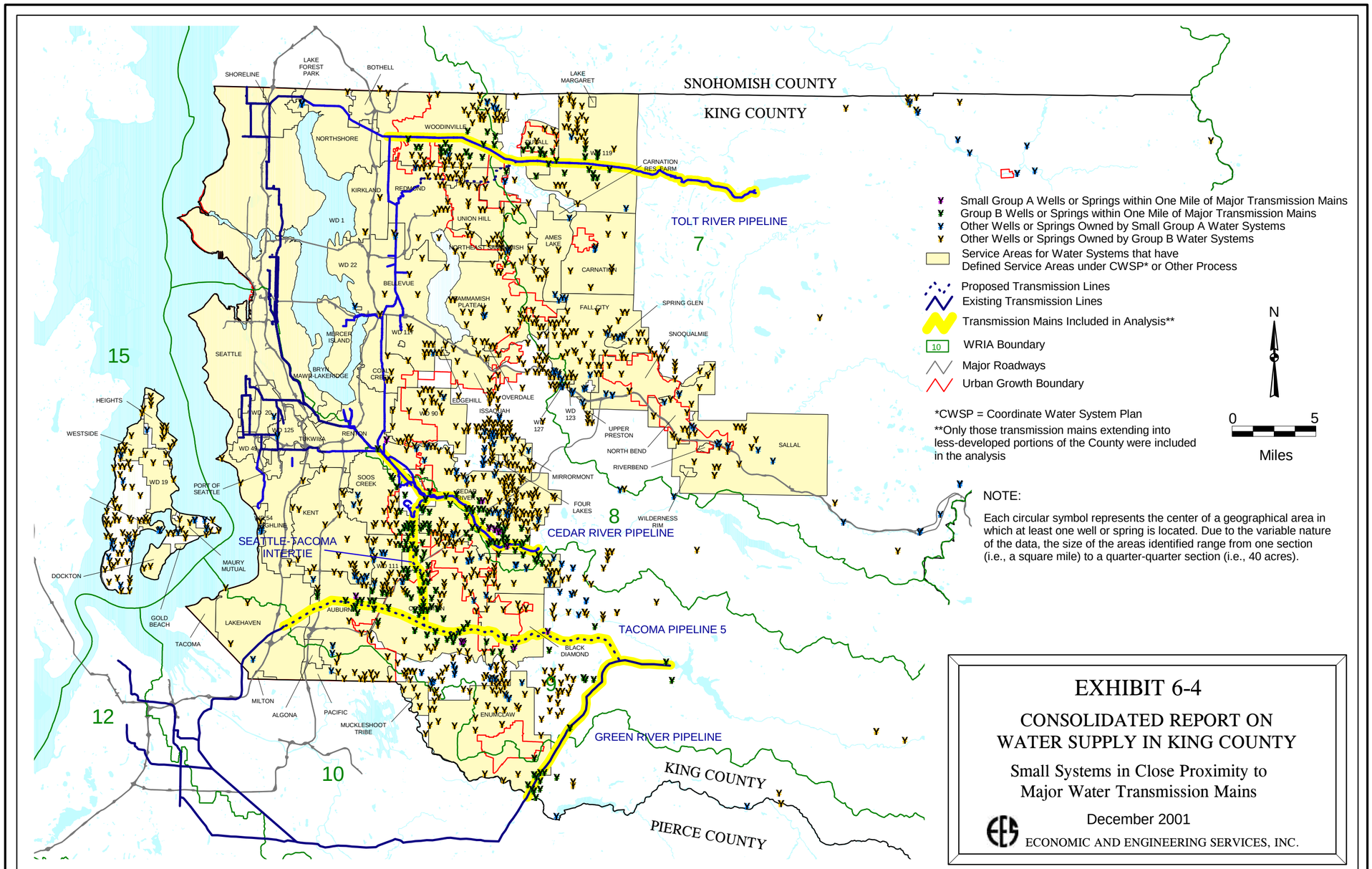


EXHIBIT 6-4

CONSOLIDATED REPORT ON WATER SUPPLY IN KING COUNTY

Small Systems in Close Proximity to Major Water Transmission Mains

December 2001

ECONOMIC AND ENGINEERING SERVICES, INC.

6.4.5 Solution 5: System Forms New Water System by Consolidating with Nearby Small Systems

Throughout the County there are numerous clusters of small, primarily Group B, public water systems. This relatively close proximity of many systems to one another yields another potential solution for small systems in jeopardy, especially those far away from larger utility service areas and existing infrastructure. Consolidation of many small systems into a single, larger water association could allow financial and administrative responsibilities to become shared. In turn, this could permit implementation of specific solutions (e.g., treatment upgrades, operations modifications, etc.) to become more feasible. A related solution would be the formation of a Public Utility District (PUD). Regulatory differences between private and public ownership of water systems may create advantages or disadvantages, depending on the specific circumstances involved.

The primary benefits of such an arrangement are:

- An increased customer base allowing for greater revenue generating and bonding capabilities, and,
- Centralization of administrative and operational responsibilities, permitting economies of scale that reduce overall costs, and improve capacity to hire and train technical staff.

Limitations inherent in this solution include:

- *Water Rights.* Many Group B systems do not currently have water rights, as they are not required for wells withdrawing less than 5,000 gallons per day (gpd). Under the scenario that multiple Group B systems consolidate according to Solution 5, application for water rights will be required if a source that originally served only one system is now relied upon by multiple systems and the pumping rate is increased above 5,000 gpd. This is an important consideration in determining the feasibility of Solution 5, as obtaining new water rights in the current political and environmental climate can be a lengthy and difficult procedure.
- *Political Acceptance.* Small systems generally prefer local control; however, this may be overcome by showing the benefits of consolidation to the affected customers. The results of higher quality water or financial viability may persuade customers to support joining with other systems.
- *Financial Limitations.* Public water systems generally adhere to the "benefit principle," which states that those customers receiving the benefit from certain improvements should pay the cost of implementing them. Applying the principle to this solution, this would mean that although consolidation results in the vesting of all system funds in the newly formed system, if the customers from one system will benefit the most

from some needed capital improvement projects, the cost of such projects should be met primarily by those customers. So, although some costs may be reduced through economies of scale and improved financing options, the financial burden of capital improvements will typically be borne by the customers of the failing system.

In some cases, Solution 5 could be used as a temporary measure, until another solution can be implemented.

6.4.6 Solution 6: System becomes Satellite System Managed by Approved Satellite System Management Agency

In the event that none of the above solutions can effectively remedy a failing small system's problems, another option is for a Satellite System Management Agency (SSMA) to address these needs. A SSMA is a person or entity that is authorized to own, operate, or provide services to one or more water systems within a county, which are not physically connected to each other. The philosophy behind satellite management is to provide an improved level of service to multiple water systems by taking advantage of economies of scale. These economies of scale may apply to operating costs, technical expertise, administrative capacity, bonding capacity, or other factors.

SSMAs are authorized in State law at RCW 70.116.134. SSMAs must be designated by the county government, and approved by State DOH. Many counties within the State have utilized the SSMA program to improve service in rural or semi-rural areas. A SSMA may be a public entity, such as a Public Utility District (PUD), a municipality or a water district; or, it may be an investor-owned utility. In some cases, the SSMA has a primary water system and takes on additional satellite systems that are not connected to the main system. In other cases, a SSMA only services satellite systems, in various locations, which are not connected to each other. The satellite systems served by a SSMA may be new systems that are created as development occurs, or pre-existing systems that experience problems and need assistance. A SSMA can provide three types of services: 1) ownership, 2) management and operations; or, 3) contract services. These categories are described further in the DOH Satellite Management Planning Handbook.

In accordance with RCW 70.116.134, counties have the authority to identify potential SSMAs to serve areas where no water purveyor has been designated, or the existing purveyor is unable or unwilling to provide service. Proposed SSMAs are then evaluated and approved by DOH, subject to criteria regarding management capability and financial viability. Based on these characteristics, SSMAs take on the responsibility for specific water systems within their jurisdiction.

There are currently no approved SSMAs in King County. Some utilities have expressed an interest to the County and to DOH in becoming SSMAs. However, until such time as approved SSMAs are identified, no satellite management services are allowed in the County, aside from related services that a utility may provide to remote areas within its own service area, under the Coordination Act process.

Additional, related options for this type of system management and/or ownership include the formation of a PUD, creation of a "remote" system, or purchase by a private, for-profit company. The latter option is an avenue that some small public water systems in western Washington have recently chosen, rather than facing potential struggles addressing increased regulatory requirements. The purchase and subsequent ownership and operation of a small system by a private, for-profit entity is regulated by the Washington Utilities and Transportation Commission (WUTC).
Limitations associated with this solution include:

- *Financial.* Although this option offers financial benefits similar to those associated with Solution 4 (i.e., a larger and sounder financial base rendering greater revenue generating and bonding capabilities), there remains the caveat that the cost of improvements to small systems are primarily the responsibility of the customers receiving the benefit from them.

  The financial situation is different for privately-owned systems, regulated by the WUTC. If consolidation occurs via the purchase of a failing system by a private company that owns other small systems, the WUTC may require that rates be applied equally to all systems owned by that entity. The philosophy behind this regulation is that consolidation is financially beneficial primarily due to the resulting economies of scale and the ability to spread the cost of capital improvements across a larger customer base. However, for-profit operations are typically reluctant to take on failing systems that require substantial investment in new or improved infrastructure.

  In both situations (i.e., ownership by a public or private entity), the problems facing a failing system may not be fully solved with a transfer of ownership or management; however, the increased flexibility of financial and administrative resources should improve opportunities for resolving outstanding problems.

In some cases, Solution 6 could be used as a temporary measure, until another solution can be implemented.

6.4.7 Solution 7: County Assumes Responsibility for System as Provider of Last Resort

The six solution options described above have been developed considering the many different situations in which failing small systems may find themselves. In the event that no such options are deemed feasible to remedy the situation, the remaining option is for the County to assume receivership of the system and implement the necessary measures to correct the situation. This is set forth in RCW 43.70.195, which states, "If there is no other person willing and able to be named as receiver, the court shall appoint the County in which the water system is located as receiver." If needed, the County has the authority to provide management and operational services to water systems, in order to ensure that public health and the environment are protected (RCW 36.94.140). However, the County has never had to assume this responsibility. If the County were to become a receiver of a failed water system, the County would be required to provide acceptable service until such time as an alternative long-term solution could be developed and approved by King County Superior Court. Alternatively, the County could contract with an entity to provide the service (e.g., a PUD).

Solution 7 would likely serve as a temporary measure only, until another solution can be implemented. In lieu of actually providing services to the failing system, the County would likely assist the system in finding a suitable, long-term solution.

6.5 Solution Identification for Hypothetical Small Systems

In order to better understand the concept of the solution strategies for small systems, this section describes three hypothetical situations a small public water system may face, based upon location and system status. The descriptions are not based upon actual systems and have been developed solely for explanatory purposes. A summary of this exercise is presented in Table 6-3.

Table 6-3
Solution Identification for Hypothetical Small Systems

Potential Solutions	System X	System Y	System Z
1. Solve by self	No	No	No
2. Connect to larger utility	Yes	No	No
3. Purchase wheeled water	No	Yes	No
4. Connect to transmission line	No	No	No
5. Form new water association	No	No	Yes
6. Satellite Management	No	No	No
7. County assumes control	No	No	No

6.5.1 Hypothetical System X Solution

In this example, a small Group B system is a homeowners' association that has struggled for years due to lack of financial and administrative resources. The system has not grown and monthly water use fees have not changed for years; therefore, although routine repair and maintenance costs have increased recently, the system does not have the funding base necessary to make necessary repairs. In order to avoid the eventuality of not being able to adequately serve its customers, the system looks for a solution. Solution 1 (noted in Table 6-3) is not considered feasible, as the president of the homeowners' association knows that the residents will not agree to substantially increased fees in order to maintain the small system that struggles to barely remain viable. The system is located just outside the service area boundaries of a larger nearby utility. For this reason, the president initially feels that Solution 2 will not be feasible; however, after discussions with the utility, he finds that the utility's infrastructure extends to the boundary and could be connected to the smaller system. Furthermore, the utility and CWSP policies are flexible enough to allow for connection of the small system to the utility, even though it lies outside the defined service area. The utility agrees to pay for the connection in order to gain the additional customers and the solution is deemed feasible.

6.5.2 Hypothetical System Y Solution

In this example, a small system serves a community located inside the service area boundaries of a larger Group A utility. Recently, decreased in-stream flows have occurred in a nearby salmon-spawning reach. An engineering study suggests that the change in flows may be a result of increased drawdown in the system's two wells due to a recent spurt in growth. Water rights constraints will not allow them to obtain more supply from the streams. Therefore, Solution 1 is deemed infeasible. The system would like to connect to the large utility in whose service area it lies, but that utility is experiencing similar problems and has a policy stating that no new demands may be exerted upon their supply. However, the larger utility does have an intertie with one of the major suppliers in the region, and decides to allow the small system to connect to their infrastructure in order to purchase water from this other supplier. Therefore, Solution 3 is selected.

6.5.3 Hypothetical System Z Solution

In this example, a small system is located far from the metropolitan core of the County and serves a small unincorporated community. Recent water quality monitoring has revealed elevated levels of arsenic in the system's water supply. Realizing that pending federal regulations regarding this contaminant will likely force the system to implement a rigorous treatment

process or abandon its source, the system searches for a solution. Unfortunately, the financial situation is not sound and will not allow for a major upgrade to the treatment system. The system is too far away from larger utilities or infrastructure to consider Solutions 2-4, but there are two nearby systems that have similar concerns regarding arsenic. The three systems decide that if they merge and pool their resources, they will be able to contract for improved operation and invest in treatment processes that will address the water quality issues and allow them to maintain their viability as a new water association.